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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,891

07/26/2005

Takako Yamaguchi

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7802

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09/05/2008

FITZPATRICK CELLA HARPER & SCINTO  
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EXAMINER

JELSMA, JONATHAN G

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/529,891	<b>Applicant(s)</b> YAMAGUCHI ET AL.	
	<b>Examiner</b> Jonathan Jelsma	<b>Art Unit</b> 1795	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____.                                     |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/03/2005, 05/16/2006, 07/21/2006</u> .                      | 6) <input type="checkbox"/> Other: _____.                         |



## **DETAILED ACTION**

### ***Summary***

1. This is the initial office action based on application 10/529,891 filed on 07/26/2005 by Takako Yamaguchi, and Yashuhisa Inao.
2. Claims 1-14 are currently pending and have been fully considered.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the use of the "concentric-circle model", see for example page 14 lines 5-20, does not reasonably provide enablement for the "eccentric model". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. Page 14 lines 5-20 teaches that the electric field distribution has an approximately concentric extension, and then teaches that the electric field distribution can be approximated by a concentric-circle model. Additionally page 15 lines 18-24 the specification states "Analyzing this distribution in greater detail... the intensity attenuates as like expanding as a concentric circle." The term "eccentric" on

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the other hand is taken to mean "located elsewhere than at the geometrical center" or "deviating from a circular path", which is contrary to the teachings of the specification.

6. Claims 5 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. The phrase "*the* wavelength of a surface plasmon polariton wave" in claim 5 renders the claim indefinite. Plasmon polaritons are electromagnetic surface waves, and so therefore it is unclear which of the plurality of waves of the Plasmon polaritons the pitch is greater than.

8. Claim 9 recites the limitation "a step of preparing an exposure mask as recited in any one of claims 1-4" in line 5 of claim 9. There is insufficient antecedent basis for this limitation in the claim. The claim is referring to a method of preparing an exposure mask as recited in claims 1-4, but claims 1-4 are not method claims, but are exposure masks, and so therefore claims 1-4 do not recite any limitations for the preparation of the exposure mask, but merely structural features.

### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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10. Claims 1-14 are rejected under 35 U.S.C. 102(b) as being anticipated by ALKAISI ("Nanolithography in the Evanescent Near Field" Advanced Materials 2001, 13, No. 12-13, July 4).

11. With respect to claims 1-5, 7-8, 9 as dependent upon claim 2, 10-12, and claim 14 as dependent upon claim 2.

12. ALKAISI teaches an exposure mask, and method of making the mask, for forming an image on a photoresist on a substrate (page 879, section 3). The mask with opaque regions is used in an exposure method, using UV illumination, from a source such as a laser (page 878, section 1 paragraph 2), utilizing the near field diffraction effects to create an image in the photoresist coated substrate beyond the diffraction limit of the projection lithographic system (page 879 section 3, and see figure 1). The exposure mask comprises opaque regions with gratings, such as dense or isolated lines (page 880 paragraphs 1-2). ALKAISI then teaches a simulation and model of the mask based on the pitch and thickness of the medium to be imaged in order to simulate and model the diffraction in the evanescent near field of the metallic gratings (page 883 section 6.1, paragraphs 1-2).

13. ALKAISI teaches an optical photoresist thickness of 60 nm (page 880 section 4 paragraph 1) where the photoresist is the layer where the image is to be produced, so  $T = \text{appx } 60 \text{ nm}$ . The line width ( $W$ ) may then be produced by less than 50 nm (page 880 section 4 paragraph 2). Figure 5b then shows 280 nm period ( $P$ ) with 70 nm apertures ( $D$ ), forming a width of the light blocking member ( $K$ ) being 210 nm (page 881 paragraph 1). Additionally the photoresist may go through further processing to give a

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uniform thickness of 45nm (T'') (page 882 section 5.2 paragraph 2 – page 883 paragraph 1). Therefore the value of  $210\text{nm} > (50\text{nm} + 2*60\text{nm}) = 170\text{nm}$ , and  $70\text{nm} < (280\text{nm} - 50\text{nm} - 2*60\text{nm}) = 110\text{nm}$ . Similarly  $70\text{nm} = (280\text{nm} - 50\text{nm} - 2*60\text{nm}*(1 + \alpha)) = 110\text{nm}$ , where  $\alpha = 1/3$ , and  $(50\text{nm} + 2*60\text{nm}) < (280\text{nm} - 70\text{nm})$ . Also  $50\text{nm} < (280\text{nm} - 70\text{nm} - 2*45\text{nm})$ .

14. With respect to claim 6 as dependent upon claim 2. The exposure mask of ALKAISI comprises opaque regions in the forms of isolated lines (page 880 paragraph 2). These isolated lines opaque region patterns are taken to be arranged 2 dimensionally (see also figure 5).

15. With respect to claim 13. Claim 13 is dependent upon claim 9 which is rejected above with respect to claim 2. ALKAISI further teaches pattern transfer methods where the pattern from the photoresist is transferred into the substrate (page 882 section 5), For the production of a wide variety of optical or electronic structure devices (page 887, section 1 paragraph 1).

### ***Conclusion***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Jelsma whose telephone number is (571)270-5127. The examiner can normally be reached on Monday to Thursday 7:00 a.m. - 5:00 p.m.

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17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/

Supervisory Patent Examiner, Art Unit 1795

JGJ